ASSIGNMENT 1 FRONT SHEET

Qualification	**BTEC Level 5 HND Diploma in Computing**		
Unit number and title	Unit 30: Application Development		
Submission date		**Date Received 1st submission**	
Re-submission Date		**Date Received 2nd submission**	
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Student declaration I certify that the assignment submission is entirely my own work and I fully understand the consequences of plagiarism. I understand that making a false declaration is a form of malpractice.			
		Student's signature	

Grading grid

P1	P2	P3	M1	M2	D1

❒ Summative Feedback:	❒ Resubmission Feedback:	
Grade:	**Assessor Signature:**	**Date:**
Lecturer Signature:		

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Table Content

I. INTRODUCTION

Through this report, it helps us understand Application Development and simulate the roles and responsibilities of a commercial developer working in a business environment to access a group of colleagues. At first, we were introduced to a business-related issue and would need to apply and use appropriate methods and practices to analyze and discuss the issues - then, to make a determination, design, create and test a solution for it.

Acronyms, Abbreviations and Definition:

	Abbreviations/Terms	Explanation
1	SRS	Software Requirement Specification
2	UC	Use Case
3	WF	Wireframe

II. BODY (P1): Explore a business-related problem and produce a well-defined Problem Definition Statement supported by a set of user and system requirements.

Actors Description

	Actor Name	Definition & Interests
1	Administrator	The administrator is the highest-level application manager who can create / edit and delete Training staff and Trainer accounts
2	Training Staff	The training staff is also a senior department behind the Administrator. Training staff directly manages students' accounts (including creating / editing / deleting), managing courses / topics (creating/ editing / deleting and assigning students / trainers into the course / topic) and have some actions with the teacher's personal information (create/ edit / delete).
3	Trainer	Trainers have the right to update personal information and view the topics / courses assigned by Training staff.
4	Trainee	Trainee can view personal schedule

Use Cases Description

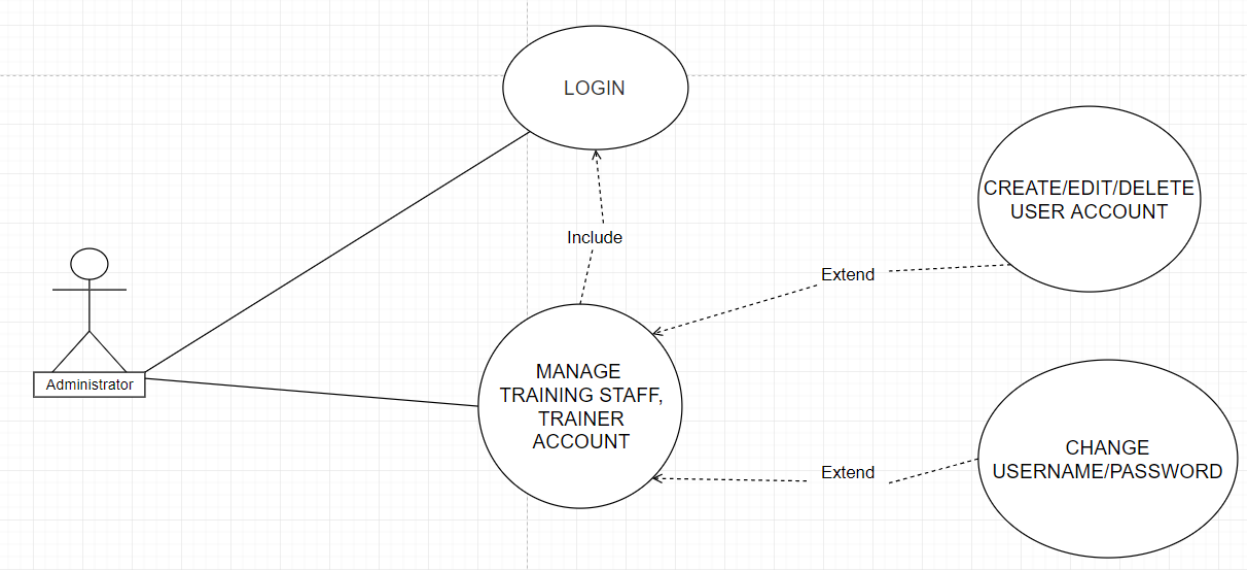
	Code	Name	Summary Description
1	UC-LG	Create Trainee	Allow actor to log into the system
2	UC-AD-01	List users	Allow actor to list users in the system
3	UC-AD-02	Search users	Allow actor to search users in the system
4	UC- AD-03	Create users	Allow actors to create new users
5	UC-AD-04	Edit users	Allow actors to edit user information (including password)
6	UC-AD-05	Delete users	Allow actor to delete a user in the system
7	UC-TN-01	Update personal profile (Trainer)	Allow actors to edit Update Personal Profile
8	UC-TN-2	View personal schedule (Trainer & Trainee)	Allow actor to View Personal Schedule in the system

Use Case & Actor mapping

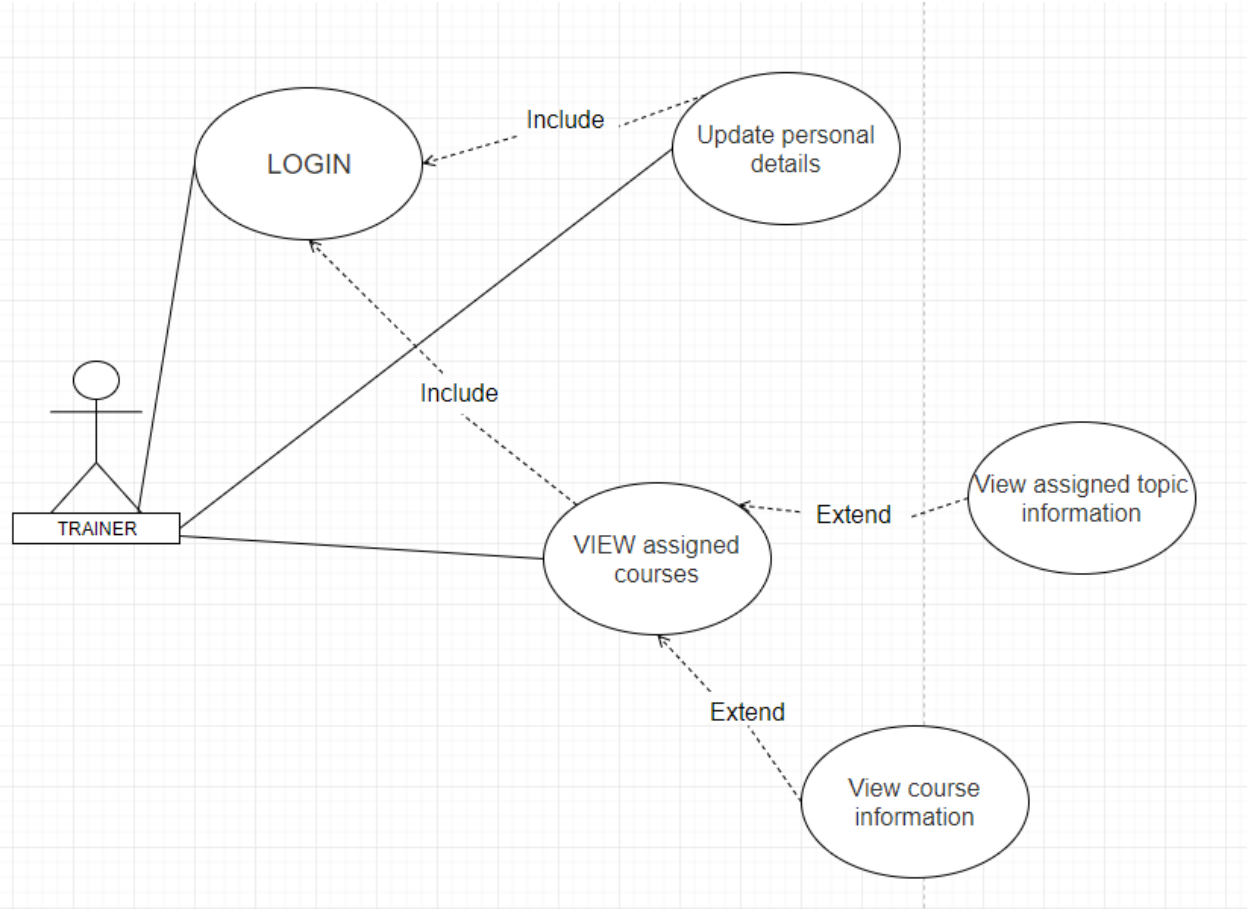
Actor / Use Case	Administrator	Training Staff	Trainer	Trainee
UC-LG: Login	x	x	x	x
UC-AD-01: List users (Training staff/Trainer) in a devision	x			
UC-AD-02: Search users (Training staff/Trainer)	x	x		
UC-AD-03: Create users (Training staff/Trainer)	x			
UC-AD-04: Edit users (Training staff/Trainer)	x			
UC-AD-05: Delete users (Training staff/Trainer)	x			
UC-TN-01: Update personal profile		x	x	
UC-TN-02: View personal schedule		x	x	x

Use Case Diagram

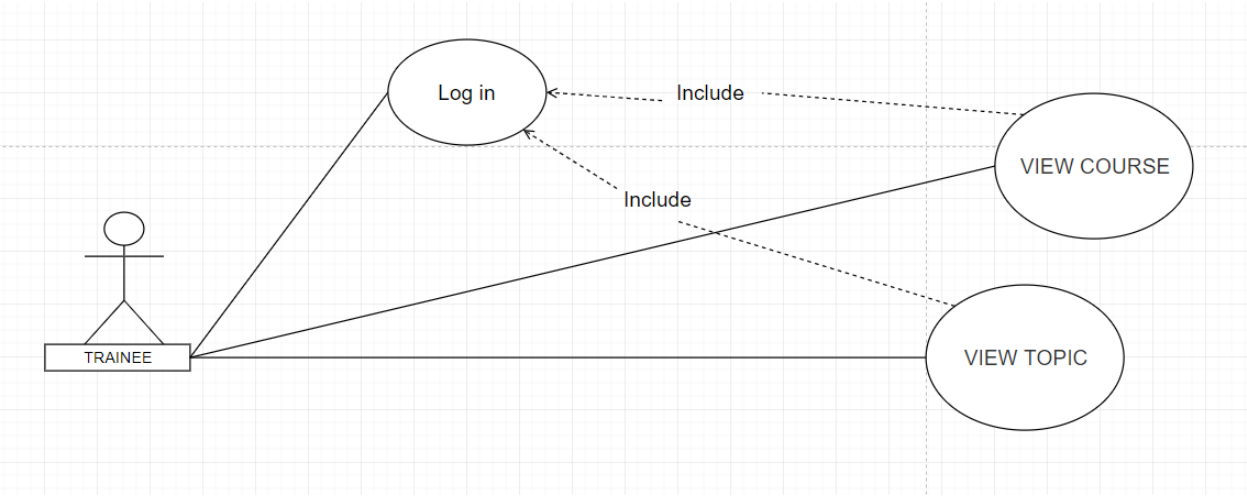
Administrator:



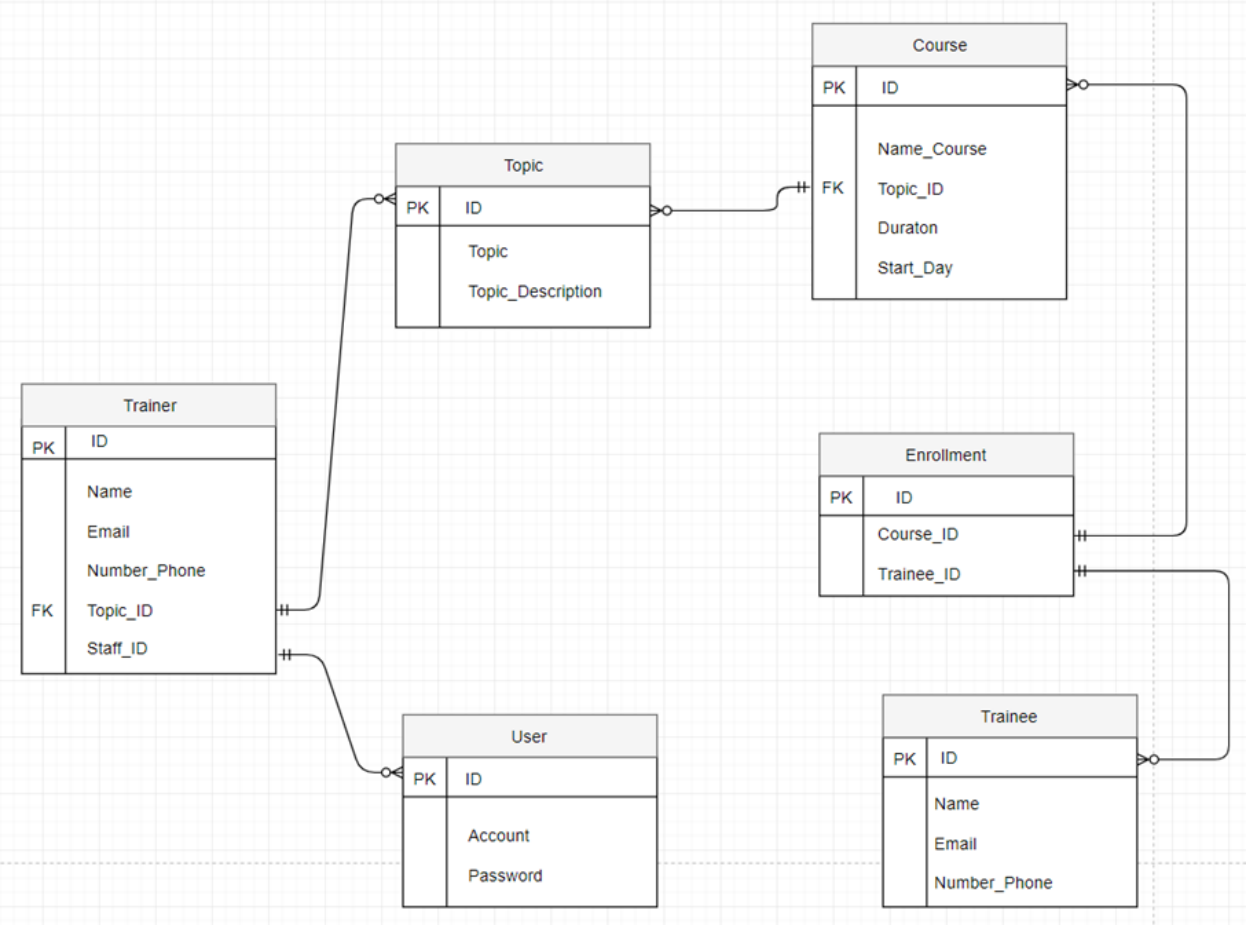
Trainer



Trainee



ERD (Entity Relationship Diagram)



Use Case Specificatiom:

UC-LG: Login

Use Case Description:

Name	Login
Code	UC-LG
Description	Allow actor to log into the system
Actor	Administrator / Training Staff / Trainer / Trainee
Trigger	Actors click on the [Login] button
Pre-condition	Actor has logged into the system
Post condition	Go to the page corresponding to the role of the actor

Activity:

Actor		System	
Main flow: Login successful			
1	Actor enters the username and password then click the [Login] button on the login page		
		2	Check the correct username / password then take them to the page page with the corresponding default role

UC-AD-01: List users (Training staff / Trainer) in a division

Use Case Description:

Name	List users in a division
Code	UC-AD-01
Description	Allow actor to list users in the system
Actor	Administrator
Trigger	Load Training Staff and Trainer management page
Pre-condition	Actor has logged into the system
Post condition	View lists all users in the system

Activity:

Actor		System	
Main flow: List users in a division successfully			
1	Actors click on sub-manager (Training Staff / Trainer)		
		2	Load the information of all users in the system then display it on the Administrator's site.

UC-AD-02: Search users (Training staff/Trainer)

Use Case Description:

Name	Search users
Code	UC-AD-02
Description	Allow actor to search users in the system
Actor	Administrator / Training Staff
Trigger	Actors click on the [Search] button on the management screen
Pre-condition	Actor has logged into the system
Post condition	View list of users found with search criteria, display an error message if users are not found eligible

Activity:

Actor		System	
Main flow: Search users successfully			
1	Click on the [Search] button on the management screen to find users		
		2	Select the list of users to be searched in the database with the keywords searched
		3	Load the user list found in the view grid and display it on the corresponding page.

UC-AD-03: Create users (Training staff/Trainer)

Use Case Description:

Name	Create users
Code	UC-AD-03
Description	Allow actors to create new users
Actor	Administrator
Trigger	Actors click the [Create] button in the management page
Pre-condition	Actor has logged into the system
Post condition	Create new user successful

Activity:

Actor		System	
Main flow: Create new user successful			
1	From the management screen, the actor presses the [Create] button.		
		2	Load Create user page
3	Fill in the information (Training Staff / Trainer) then click [Create] button		
		4	Validation of input information.
5	Correct information (When necessary or the system has an error message)		
		6	Save the new user information into the database and the success notification system then return to the Manage page

UC-AD-04: Edit users (Training staff/Trainer)

Use Case Description:

Name	Edit users
Code	UC-AD-04
Description	Allow actors to edit user information (including password)
Actor	Administrator
Trigger	Actors click on the [Edit] button on the management screen
Pre-condition	Actor has logged into the system
Post condition	Edit information user successful.

Activity:

Actor		System	
Main flow: Edit user successfully			
1	From the management screen, the actor presses the [Edit] button.		
		2	Load Edit user page
3	Fill in the information (Training Staff / Trainer) then click [Edit] button		
		4	Validation of input information.
5	Correct information (When necessary or the system has an error message)		
		6	Save the new user information into the database and the success notification system then return to the Manage page

UC-AD-05: Delete users (Training staff / Trainer)

Use Case Description:

Name	Delete User
Code	UC-AD-05
Description	Allow actor to delete a user in the system
Actor	Administrator
Trigger	Actors click on the [Delete] button on the management screen
Pre-condition	Actor has logged into the system
Post condition	Delete user successfully

Activity:

Actor		System	
Main flow: Delete user successfully			
1	From the management screen, the actor presses the [Delete] button.		
		2	Delete the user information from the database then notify the successful task and move to the Manage page

UC-TN-01: Update Personal Profile

Use Case Description:

Name	Update Personal Profile
Code	UC-TN-01
Description	Allow actors to edit Update Personal Profile
Actor	Administrator/Training staff/Trainer/Trainee
Trigger	Actors click on the [Update] button on the management screen
Pre-condition	Actor has logged into the system
Post condition	Update Personal Profile successful.

Activity:

Actor		System	
Main flow: Update Personal Profile successfully			
1	From the management screen, the actor presses the [Update] button.		
		2	Load Update Personal Profile page
3	Fill in the information of Personal Profile then click [Update] button		
		4	Validation of input information.
5	Correct information (When necessary or the system has an error message)		
		6	Save the new Personal Profile information into the database and the success notification system then return to the Manage page

UC-TN-02: View Personal Schedule

Use Case Description:

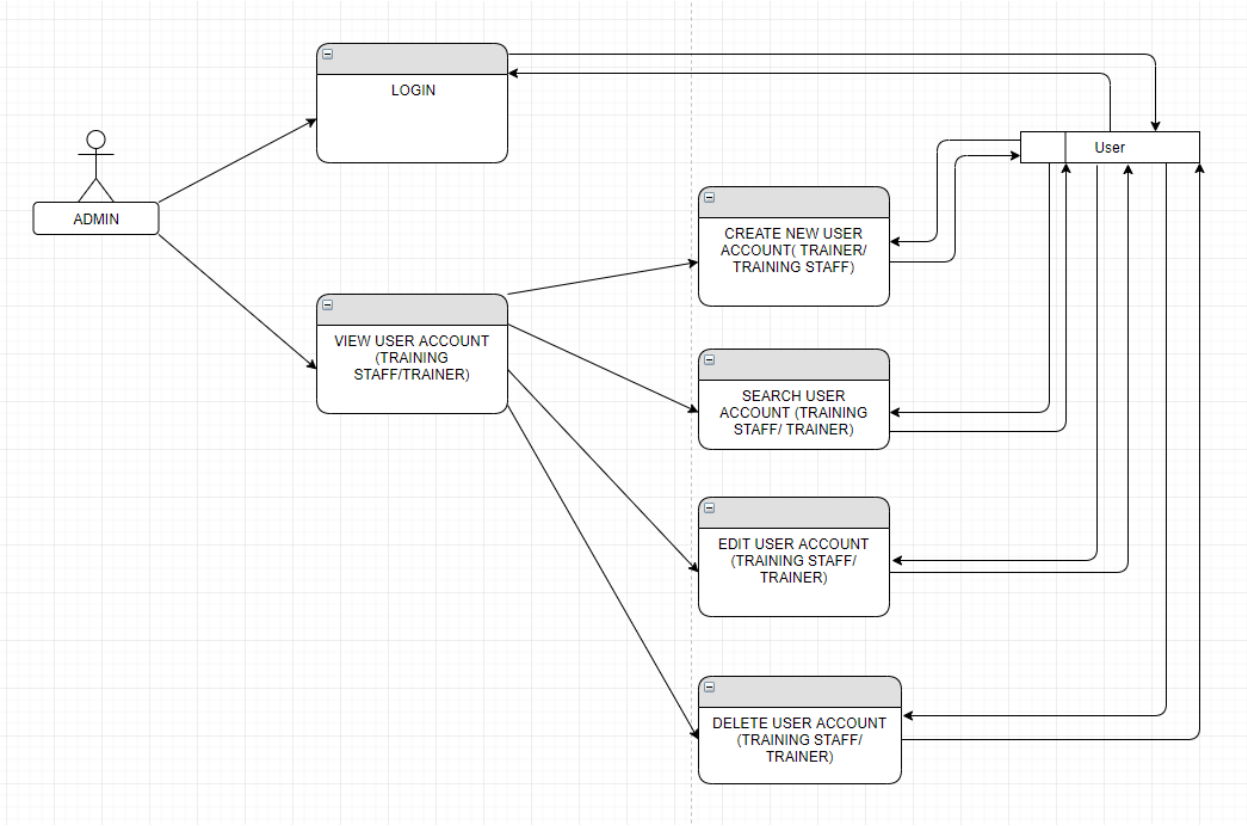
Name	View Personal Schedule
Code	UC-TN-02
Description	Allow actor to View Personal Schedule in the system
Actor	Training Staff / Trainer / Trainee
Trigger	Actors click on the [View] button on the management screen
Pre-condition	Actor has logged into the system
Post condition	View list of Personal Schedule found with search criteria, display an error message if Trainee are not found eligible

Activity:

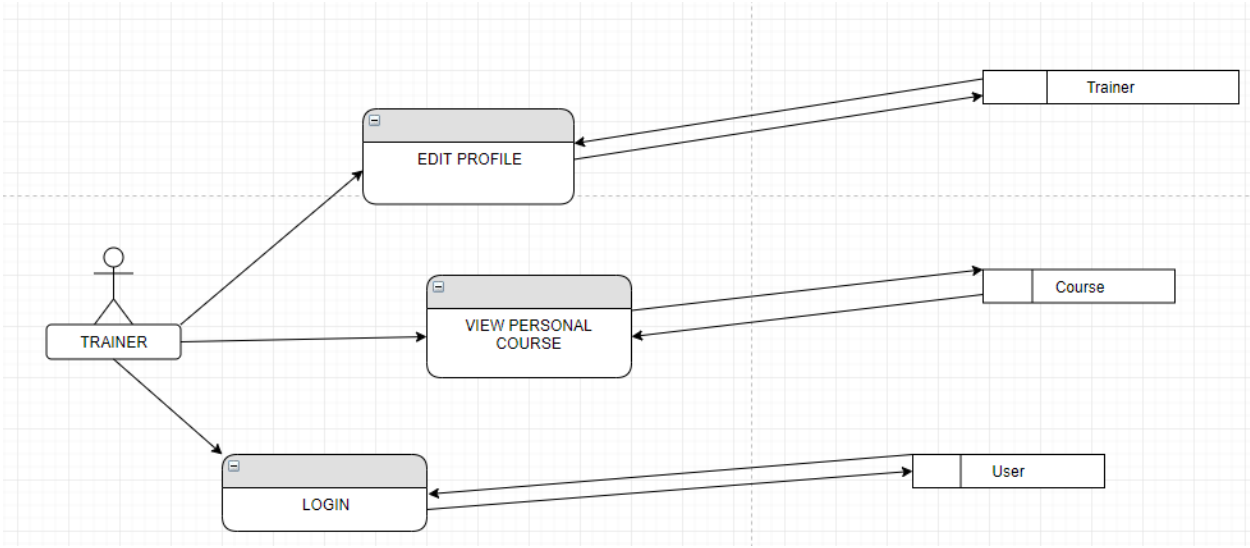
Actor		System	
Main flow: View Personal Schedule successfully			
1	Click on the [Personal Schedule] button on the management screen to View Personal Schedule		
		2	Select the Course
		3	Load the Course list found in the view grid and display it on the corresponding page.

Data Flow Diagram (DFD):

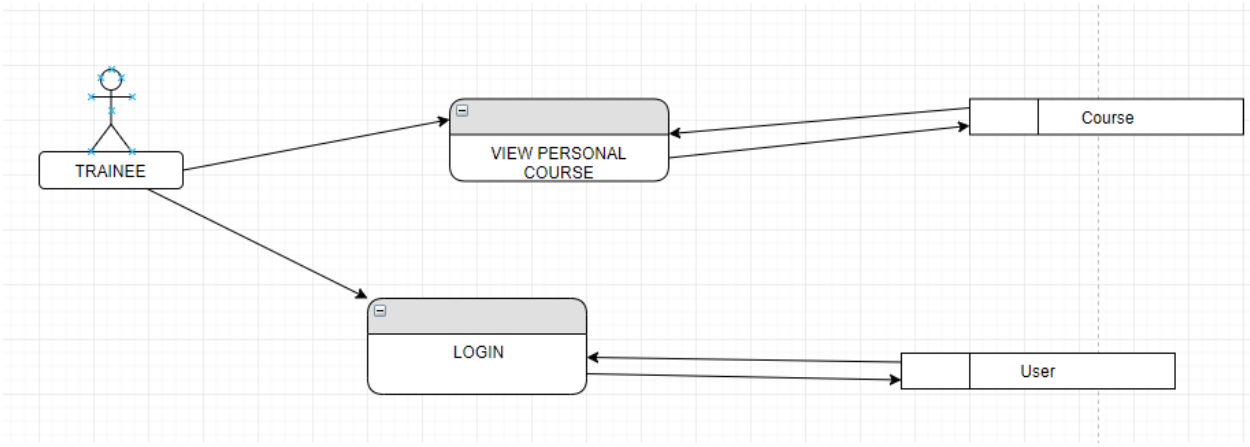
Administrator:



Trainer

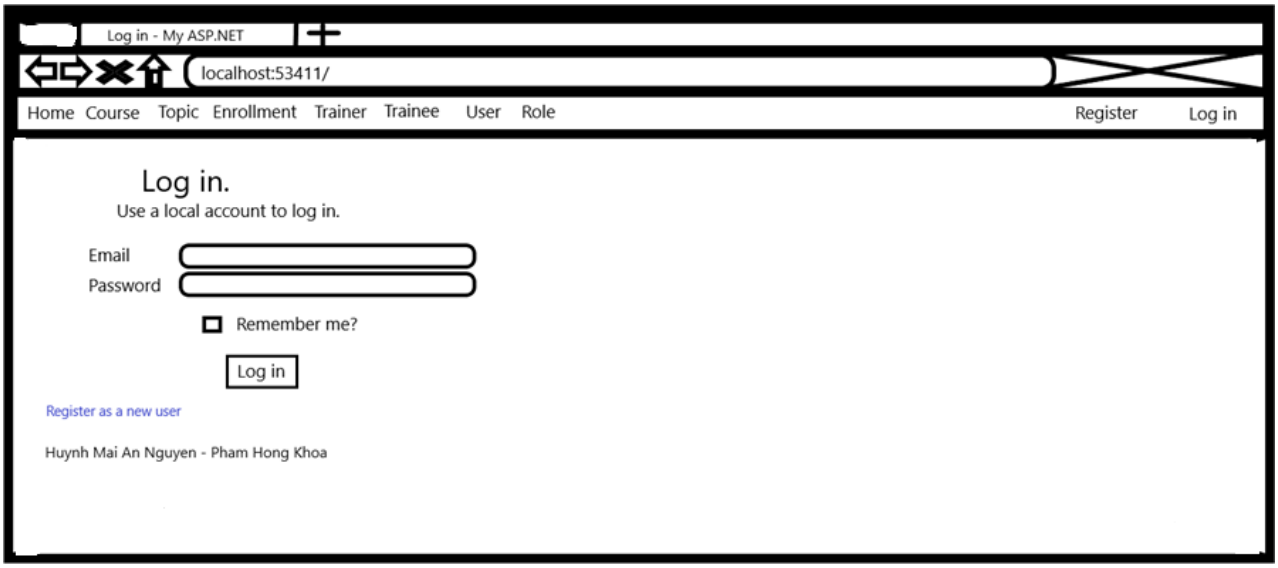


Trainee



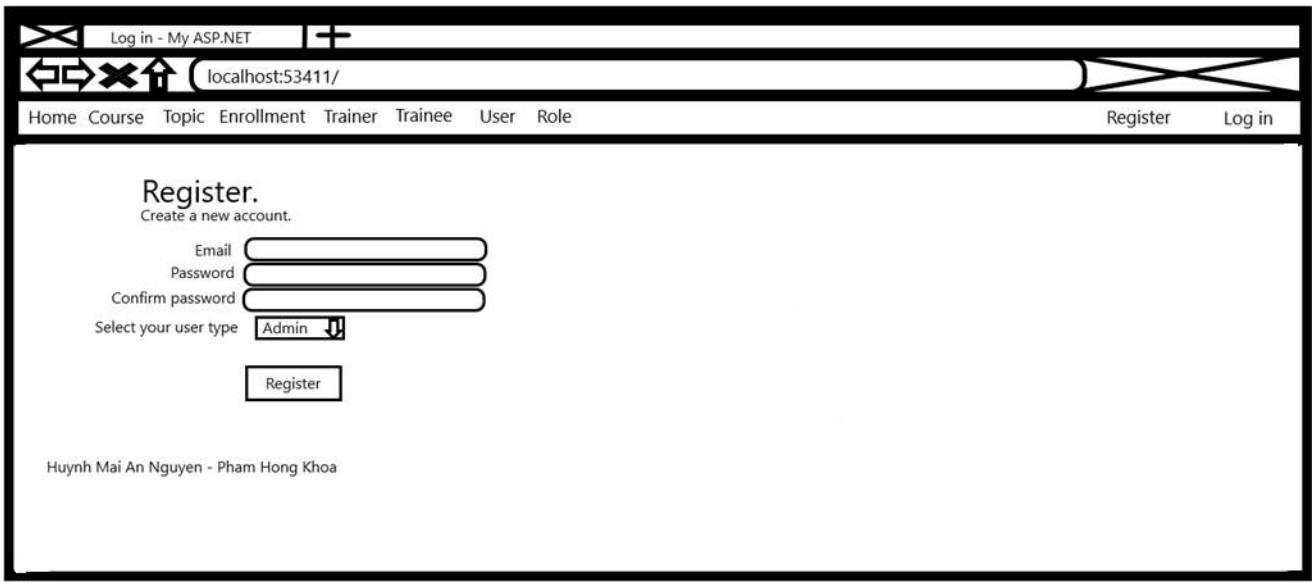
Wireframe

Home page

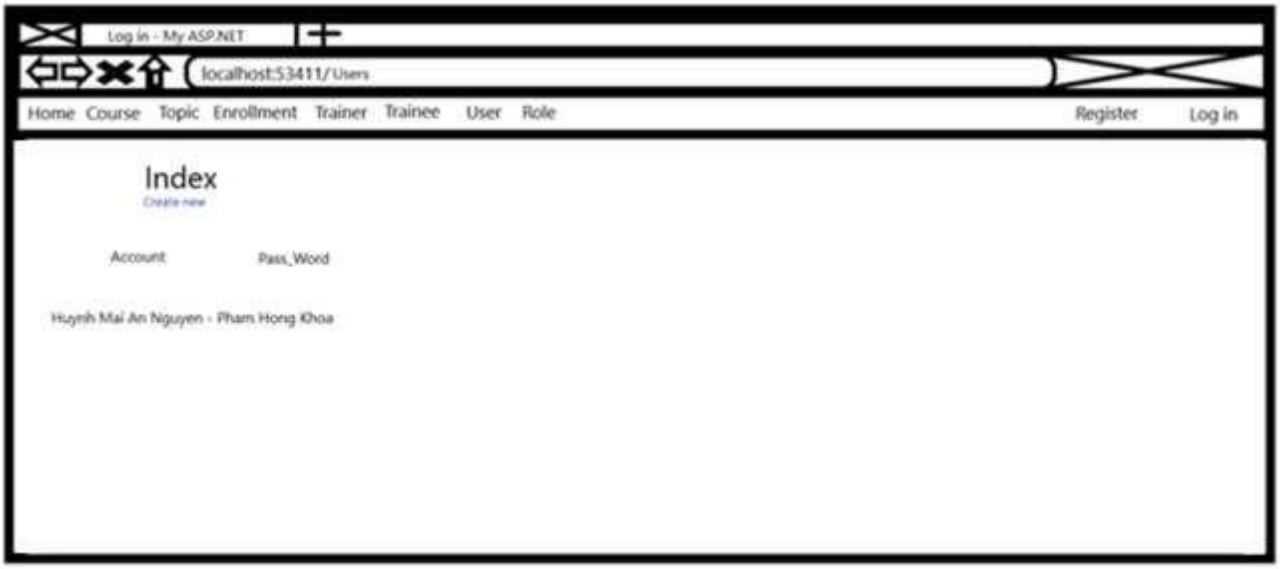


Login page

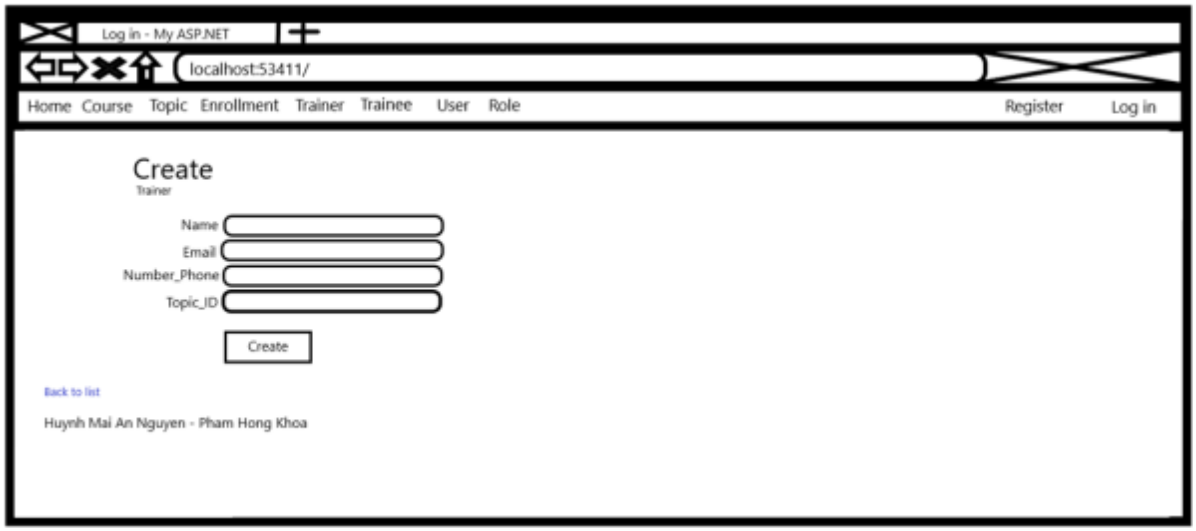
Management page: Administrator can Register new Account in this screen.

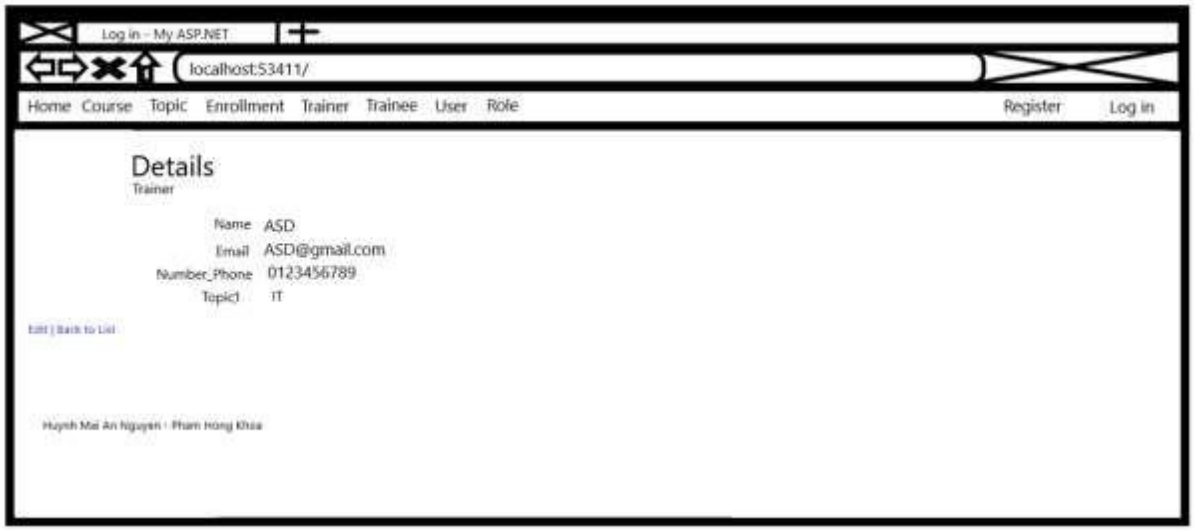


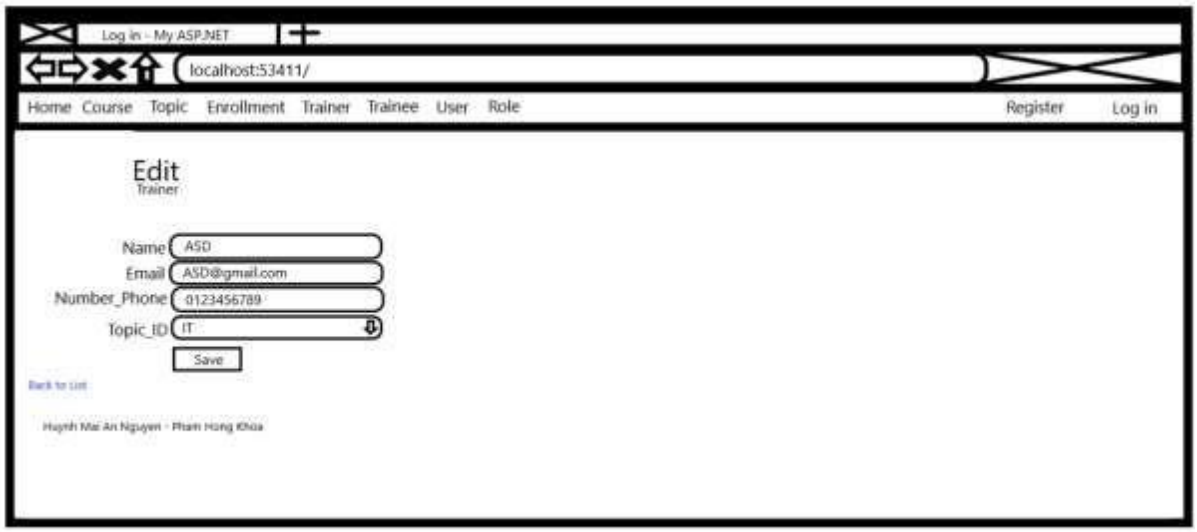
Management page: Administrator can Create, Edit, Delete, new User in this screen.



Manage Trainer: Admin can view, create, delete, edit trainer




Log in - My ASP.NET
localhost:53411/
Home Course Topic Enrollment Trainer Trainee User Role
Register Log in
Details
Trainer
Name ASD
Email ASD@gmail.com
Number_Phone 0123456789
Topic1 IT
Edit | Back to List
Huynh Mai An Nguyen - Pham Hong Khoa


Log in - My ASP.NET
localhost:53411/
Home Course Topic Enrollment Trainer Trainee User Role
Register Log in
Edit
Trainer
Name ASD
Email ASD@gmail.com
Number_Phone 0123456789
Topic_ID IT
Save
Back to List
Huynh Mai An Nguyen - Pham Hong Khoa

View Personal Information

View Personal Schedule: Trainer and Trainee can search View Personal Schedule in this page.

System constraints:

Database: Must be clear about the primary key, secondary key for each position and must be specifically authorized for each role in the system (Administrator, Training Staff, Trainer, Trainee).

Hardware:

- Personnel should be provided with all the necessary equipment to carry out the project
- The equipment must be checked regularly, regular maintenance and maintenance to prevent unexpected situations.
- Trained staff with a good knowledge base are required to operate

Software:

- The system completely uses free technologies
- The software should note the version being used

Programming language being used:

- Application server software: HTML, CSS, PHP
- Client software for employees: HTML, CSS, PHP.
- Data are identified and recorded by XML.

Industry standards: The system must comply with ISO 10646 (Unicode UTF-8) to encode character sets

P2 Determine any areas of risk related to the successful completion of your application

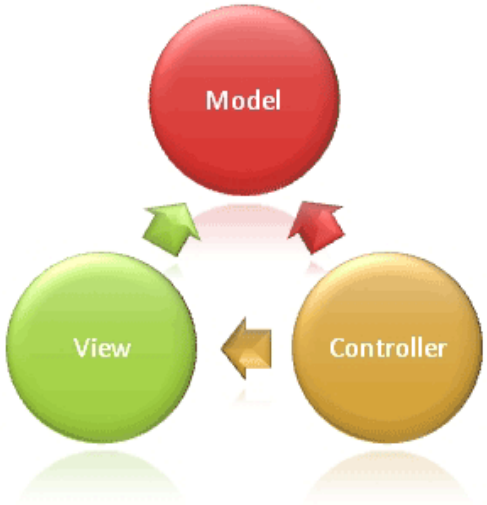
Risk	Likelihood (High, Medium, Low)	Impact (High, Medium, Low)	Risk Response Strategy (Avoid, Transfer, Mitigate or Accept the risk)	Actions required	By	Due Date
Database risks are not guaranteed	High	High	Avoid the risk	Always update to the latest version Regularly check and update the database	An Nguyen	25/12/2019
Risk of processor overload	Medium	High	Mitigate the risk	Upgrade your processor or maybe hire a computer from outside	An Nguyen	25/12/2019
Human resources risks are not guaranteed	Low	Medium	Accept the risk	Need to ensure human resources before implementing the project Need backup human resources	An Nguyen	25/12/2019
Risk of motivation of members	Medium	Medium	Mitigate the risk	Regularly motivate staff If done well, there will be rewards	An Nguyen	25/12/2019
Debug Risks	High	High	Avoid or Transfer the risks	Find out the cause and give solutions for each causes	An Nguyen	25/12/2019

Risk Assessment Form

P3 Research the use of software development tools and techniques and identify any that have been selected for the development of this application.

MVC Model

MVC model is a model standard and plays an important role in the process of building - developing - operating and maintaining a system or an application - software. It creates a Model - View - Controller 3 layer model that is separate and interactive, so that experts can easily rely on the model to exchange and handle operations quickly. This is a model that has been around since the 70s of the 20th century at Xerox PARC laboratory in Palo Alto, it doesn't depend on the environment, the construction platform or the development language. We can apply MVC model to projects in Windows, Linux environment ... and use any language like PHP, ASP, JSP, C # ...



MVC pattern is divided into 3 processing classes including Model - View - Controller:

- Model: is the place where business operations interact with data or database management system (mysql, mssql ...); it will include classes / functions that handle many operations such as database connection, data query, add - delete - edit data ...
- View: is a place that contains interfaces such as buttons, input boxes, menus, images ... it is responsible for displaying data and helping users interact with the system.

- Controller: is a place to receive processing requests sent from users, it will include classes / functions that handle many logical operations to get the right data needed by the Model class operations provided and displayed. That data is out to the user thanks to the View class

Interaction between classes in MVC model

- Controller - View will get the images, buttons ... or display the data returned from the Controller so that users can observe and manipulate. In this interaction, there may also be no data taken from the Model and then it is only responsible for displaying as merely images, buttons ...
- Controller - Model is the process flow when the controller receives requests and input parameters from the user, the controller will use the classes / functions in the model needed to retrieve the correct data.
- The View - Model can interact with each other without the Controller, it only takes care of displaying data and not through any logics. It is like the static data display area on websites like block slidebar ...

MVC model can be applied to many different types of projects: website projects, application projects - software, ... but in the scope of the article, we will only find out how this model is applied in website construction and development projects.

Advantages and disadvantages of MVC model

Advantages	Disadvantages
• Projects can apply MVC model right away, regardless of the environment, construction platform or development programming language; • Creating a standard model for many projects, experts will approach - learn about those projects quickly and effectively. If you know the MVC model of a project, then when approaching another project that you have never known or contacted, but it is built with MVC model, it will not be difficult. States easy. Learning one but being able to understand and use ten. • Help programmers, managers, investors, PM ... can understand how the project works or help programmers easily manage - develop the project. It is not a language, but when they look at it, they will understand what it is, then they can exchange requests and discuss work. • This is a standard model, it is most optimal today compared to many other models and is used in many projects and many fields, especially in application technology - software production. Programmers use the standard MVC model to easily distribute and transfer technology. • This is a simple model, handling simple operations, and easy to deploy with small projects.	The technical requirements are quite high, have a solid knowledge of standard models; it is difficult to implement with projects requiring more complexity. There is currently a new paradigm concept that HMVC is gradually replacing MVC

Stack

A solution stack or software stack is a collection of subsystems or software components needed to create a complete platform so that no additional software is needed to support applications. The app is said to "run on" or "run on top" of the resulting platform.

	WINS	**XAMPP**	**MEAN**	**MERN**
Define	Windows Internet Service (WINS) is used to resolve the NetBIOS names to produce IP Addreses In today's new network models, the primary name resolution solution is DNS service, additional deployment of WINS service is an option, and complete optional.	XAMPP is a web server creation program applied on Linux, MacOS, Windows, Cross-platform, Solaris operating systems. What does the abbreviation XAMPP mean? XAMPP is based on the integration of 5 main software: Cross-Platform (X), Apache (A), MariaDB (M), PHP (P) and Perl (P), so the name XAMPP stands for The first letter of this 5 software.	MEAN is a free and open-source JavaScript software stack for building dynamic web sites and web applications.	MERN is a web development framework. It consists of MongoDB, ExpressJS, ReactJS, and NodeJS as its working components.
Database	SQL Server	MariaDB or MySQL	MongoDB	MongoDB
Programing language	C#	Perl	JavaScript	JavaScript
Web Server	Internet Information Services	Apache	Node.js	Node.js
Operating system	Windows Server	Cross-flatform	Cross-flatform	Cross-flatform

The tools and framework used in our application:

- **ASP.NET Framework**

ASP.Net is a web development platform, first released by Microsoft in 2002. The platform is used to create web-based applications.

The first ASP.Net version deployed was 1.0 and the latest ASP.Net version was version 4.6. ASP.Net is designed to be compatible with the HTTP protocol. HTTP is the standard protocol used on all web applications.

ASP.Net applications can be written in many .Net languages. Including language types like C #, VB.Net and J #.

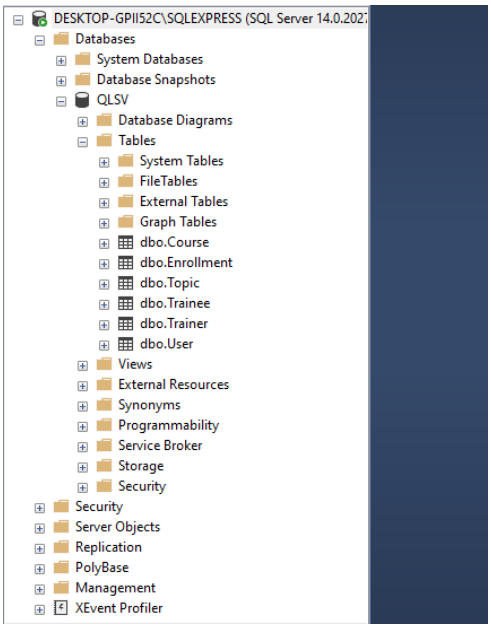
ASP stands for Active Server Pages, and .NET stands for Network Enabled Technologies.

- **Microsoft SQL Server Management Studio (SSMS)**

Microsoft SQL Server Management Studio (SSMS) is an integrated environment for managing SQL Server infrastructure. It provides user interface and a group of tools with rich script editors that interact with SQL Server.

- **SSMS tool**

SSMS provides tools for configuring, managing, and administering versions of Microsoft SQL Server and it brings together a rich range of graphic and visual design tools and scripting editors for single applications. Simplify working with SQL Server. The integrated SSMS features come from Enterprise Manager, Query Analyzer, and Analytics Manager, along with the features included in previous releases of SQL Server. It supports most SQL Server administrative tasks and maintains a single integrated environment for managing and editing SQL Server Database Tools.



Microsoft SQL Server Management Studio allows users to easily create tables to store data inside.

In this Project, My team used Microsoft SQL Server Management Studio to design database for web app

- **SSMS components**

Microsoft SQL Server Management Studio features include Object Explorer, which can view and manage all objects in an instance of SQL Server; Template Explorer, which builds and manages text files, can be reused to speed up query and script development; Solution Explorer, builds projects that are used to manage administration items, such as queries and scripts. (Microsoft plans to delete Solution Explorer in versions other than Microsoft SQL Server 2016). SSMS components customize shortcuts and view attribute pages; connect to versions of Database and Analysis Services; intuitive design tools; and interactively build and debug queries and scripts.

- **Visual Studio**

Visual studio is one of Mcrosoft's most famous programming and website design tools, and no software has yet to replace it. Visual Studio is written in 2 languages that are C # and VB +. These are two programming languages that help users to program the system easily and quickly through Visual Studio.

Visual Studio is a system programming software manufactured directly from Microsoft. Since its inception, Visual Studio has had many different versions of use. That, helps users to choose the version compatible with their models as well as the most suitable configuration.

Besides, Visual Studio also allows users to choose the main interface for their computers depending on their needs.

Some features of Visual Studio software

- Code editing

Like any other IDE, Visual Studio includes a code editor that supports syntax highlighting and code completion using IntelliSense not only for functions, variables, and methods, but also for constructs. structured languages such as: Queries or loops.

Besides, the Visual Studio code editor also supports setting bookmarks in code so that it can be navigated quickly and easily. Support for navigation such as Narrow code blocks, incremental search, etc.

Visual Studio also has background compilation, which means that when the code is being written, the software will compile it in the background to provide syntax feedback as well as error compilation and is marked with ripples. red wave.

- Debugger

Visual Studio has a debugger that features both a machine-level debugging and source-level debugging. This feature works with both management codes like machine language and can be used to debug applications written in languages supported by Visual Studio.

- Design
    - Windows Forms Designer

      Used for the purpose of building a GUI using Windows Forms, which are arranged to build internal control buttons, or can lock them into the side of the form. Data presentation controls can be linked to data sources such as databases or queries.

- WPF Designer

This feature is similar to Windows Forms Designer which supports the use of drag and drop metaphors. Use human-computer interaction targeting the Windows Presentation Foundation.

- Web designer / development

Visual Studio also has a website editor and designer that allows websites to be designed according to drag and object features.

Benefits of using Visual Studio

- Visual Studio supports programming in many languages such as C / C ++, C #, F #, Visual Basic, HTML, CSS, JavaScript.
- As a tool to support Debug easily and strongly as: Break Point, see the value of variables during run, support debug each command.
- Visual Studio interface is very easy to use for beginners to programming.
- Visual Studio supports developing applications: desktop MFC, Windows Form, Universal App, mobile applications Windows Phone 8 / 8.1, Windows 10, ...
- Visual Studio supports professional application development with drag and drop tools.
- Visual Studio is widely used by programmers around the world.

In addition, our team also uses Draw.io to draw the diagrams that the wireframe needs

Draw.io is a very powerful diagramming tool, supports many shapes, runs online without installation but is free and unlimited number of charts like many other web-based drawing tools. You can draw diagrams of the network, electricity, sketch the locations of rooms in the house, or

draw business, operation, and production processes. Tech professionals will also love Draw.io because it allows you to draw dozens of software, hardware and system design diagrams. Draw.io has a rich library of templates so you can get started faster, not have to redraw all the first.

- **The choice of stacks and tools suitable for the project.**

For this project, after carefully selecting and considering the pros and cons, we decided to use the WINS stack for the following reasons:

Firstly, Windows is an extremely popular operating system today. Windows server is more secure than Linux server, because with Linux server, Openssl is installed on all Linux platforms. All Linux servers have been affected by heartbleed. Openssl is a package that handles SSL protocol everywhere. It is used for Https, SSL via VPN, secure SMTP, IMAP, SSHD, ... so it easily leads to viruses on the computer. By working in Windows server, you can easily back up in Windows and also easily restore windows backup. Besides, we have developed applications on Visual Studio. In addition, all team members use Windows servers for their computers and devices. Therefore, choosing a Windows server for this project is very reasonable.

The next reason, Microsoft's .NET framework is still one of the most popular services today. When using .NET to develop a web application, it creates powerful and high performance applications with simplicity and ease. Additionally, the caching system in .NET is easy to use. It is also designed to expand.

Furthermore, with .NET is a completely open source, cross-platform implementation, ensuring a large technical community can continuously contribute to its development. ASP.NET has built-in automatic monitoring. Windows Web Server closely monitors the websites and applications running on it. In case any problem like memory leak or infinite loop occurs, it will warn them. This allowsthem to directly repair or create new processes. Monitoring ensures greater stability and transparency of .NET applications. On the other hand, our strength in programming languages is C # and the .NET framework for these programming languages. Microsoft is always updating C # with new programming models.

Next, Microsoft SQL Server is an outstanding solution for data processing with a multitude of features for transactions, referential integrity, backups, duplication and replication. SQL Server comes with in-memory tables and can provide some real-time solutions, which cannot be done fast enough just by SQL and regular tables.

We also chose to use Visual Studio for application development as this is an IDE with more features to help developers, such as a debugger, etc. And the most important reason I chose it is because it supports working with C # and .NET to develop API.NET web-based applications (MVC). On the other hand, it also supports other services like Azure Cloud and GitHub.

Finally, ASP.NET has built-in automatic monitoring. Windows Web Server (ISS) closely monitors the websites and applications running on it. In case any problems like memory leaks or infinite loops occur, it will immediately alert them. This allows you to directly correct these behaviors and create new processes. Monitoring ensures the stability and transparency of .NET applications.

In short, based on the reason we mentioned above, WINS is the most suitable stack model for web-based application that we will develop in this project.

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